

Q400G-112-LR4

400G QSFP112 LR4 | 1310 nm | 10 km

1. Product overview

Hot-pluggable 400G QSFP112 optical module for single-mode fiber (SMF). Four PAM4 lanes support 106.25 Gb/s per channel. 4 x 100G PAM4 EML CWDM lasers; PD receiver. Optical connectivity uses Duplex LC.

2. Key features

- 4-channel PAM4 architecture; Duplex LC optical interface
- Maximum power consumption 10 W; single +3.3 V supply
- Digital diagnostic monitoring; operating case temperature 0 to +70°C
- Reach: 10 km

3. Applications

400GBASE-LR4 Ethernet; switch and router connections; data centers; other 400G interconnect requirements.



4. Technical data

Parameter	Specification
Form factor / aggregate rate	QSFP112 / 400G
Fiber / optical connector	single-mode fiber (SMF) / Duplex LC
Power consumption	10 W max
Absolute maximum ratings	Storage -40 to +85°C; humidity 15-85%; supply -0.5 to +3.6 V.

Electrical characteristics (limits and units follow the source)

Parameter	Specification	Parameter	Specification
Supply current / initialization	2425 mA max / 2000 ms max	RX differential output swing	900 mV max
TX differential p-p tolerance	900 mV min	RX DC common-mode voltage	-0.35 to 2.85 mV
TX / RX termination mismatch	10% max	RX common-mode noise, RMS	17.5 mV max

Mechanical data: Outline callouts (source): 87.30 ±0.30; (122); 29.60 ±0.10; 8.50 ±0.10; 18.35 ±0.10; 18.45 max; 19 max; 35 max; 3.4 max; 1.6 max.

Supply filter: 1 µH on each VccRx/VccTx/Vcc1 branch; 22 µF and 0.1 µF at the input and each branch. Inductor DC resistance <0.1 ohm. Host filter voltage drop counts toward DC set-point accuracy.

5. Recommended operating conditions

Parameter	Specification
Case temperature	0 to +70°C
Supply voltage (min / typ / max)	3.135 / 3.3 / 3.465 V
Transmission distance	10 km

Apply VccRx, VccTx and Vcc1 concurrently. All GND pins are common and connect directly to the host ground plane. Connector rating: 1.5 A per pin; source note specifies 2.0 A for high module power of 15-20 W.

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6. Optical characteristics

Transmitter / common	Specification
TX / RX rate, each lane	53.125 ±100 ppm GBd; PAM4
L0 wavelength, min/typ/max	1264.5 / 1271 / 1277.5 nm
L1 wavelength, min/typ/max	1284.5 / 1291 / 1297.5 nm
L2 wavelength, min/typ/max	1304.5 / 1311 / 1317.5 nm
L3 wavelength, min/typ/max	1324.5 / 1331 / 1337.5 nm
SMSR	30 dB min
Average launch power / lane	-2.7 to +5.1 dBm
OMAouter / lane	4.4 dBm max
Minimum OMAouter / lane	0.3 dBm for TDECQ <1.4 dB; -1.1 + TDECQ dBm for 1.4 ≤ TDECQ ≤ 3.9 dB
TDECQ / lane	3.4 dB max
Average TX-off power / lane	-16 dB max
Extinction ratio	3.5 dB min
Transition time	17 dB/Hz max
TX overshoot / undershoot	25% max
TX peak-to-peak power	5.2 dBm max
RIN15.6OMA	-136 max
Optical return loss tolerance	15.6 dB max
TX reflectance	-26 dB max

Receiver / test conditions	Specification
RX lane wavelengths / rate	Same L0-L3 ranges and rate as TX
Damage threshold / lane	6.1 dBm
Average receive power / lane	-9 to +5.1 dBm
Receive OMAouter / lane	4.4 dB max (source unit)
RX reflectance	-26 dBm max
Sensitivity OMAouter / lane	-6.8; -8.2 + TECQ dBm (both in max column)
Stressed sensitivity / lane	-4.3 dBm max
Stress-test eye closure / lane	3.9 dB max
Aggressor lane OMAouter	-0.4 dBm max

7. Digital diagnostics and management

DDM implemented. IIC fast-mode clock: 1 MHz max; clock stretching: 500 µs max; data hold time: 0 ns min. SCL pin 11 and SDA pin 12 provide the 2-wire interface.

Memory map: Lower page: dynamic module information (00h); bank select 7Eh, page select 7Fh. Upper pages 80h-FFh: 00h system ID/advertising; 01h revision codes/advertising; 02h module/lane thresholds; 03h user EEPROM; 04h tunable laser advertising; 05h-9Fh reserved; B0h-FFh custom. Bank pages 10h channel control/masks, 11h state/flags/monitors, 12h diagnostics, 13h-15h WDM/FEC, 16h-17h coherent reserved, 18h-1Dh reserved, 1Eh-1Fh custom. Pages 20h-3Fh and 40h-4Fh coherent reserved; 50h-9Fh reserved; bank 0 9Fh CDB command/local payload, A0h-AFh extended payload (CDB); banks >0 reserved as shown.

Pin assignment: TX symbols: 36 and 37 Tx1p; 3/2 Tx2p/n; 33/34 Tx3p/n; 6/5 Tx4p/n; RX p/n lanes 1-4: 17/18, 22/21, 14/15, 25/24. GND: 1,4,7,13,16,19,20,23,26,32,35,38. VccRx/Tx/1: 10/29/30. Control: 8 ModSelL; 9 ResetL; 11 SCL; 12 SDA; 27 ModPrsL; 28 IntL; 31 InitMode (legacy LPMode).

8. Safety and regulatory

QSFP112 MSA; 400G Ethernet specifications; Class 1 laser; RoHS 6.0 (as stated in source).

9. Ordering information

GLOBALfiber part number	Product description
Q400G-112-LR4	QSFP112 400G-LR4 4x100Gbps PAM4, 1310nm 9dB 10km SM LC

10. General notes

Source units are retained: TX-off power in dB, transition time in dB/Hz, RX OMAouter in dB, RX reflectance in dBm and electrical common-mode voltage in mV. Damage threshold is in the maximum column. OMA minimum conditions extend to TDECQ 3.9 dB, while the TDECQ limit is 3.4 dB. Ordering sensitivity is < -6.8 dBm@OMA. Pin 36 and 37 are both labelled Tx1p; pins 33/34 and 36/37 have inconsistent polarity/direction descriptions.